

12.

$$\int (x^{1/3} + x^{-1/3}) dx$$

$$\frac{3}{4} x^{4/3} + \frac{3}{2} x^{2/3} + C$$

13.

$$\int \frac{1}{3} x^{-2/3} dx = \frac{1}{3} \cdot 3 x^{1/3} + C$$

$$x^{1/3} + C$$

14.

$$\int (3\sin x - \sin^3 x) dx$$

$$-3\cos x + \cos^3 x \underline{\underline{+3}} + C$$

$$-3(-\sin x) - (\sin^3 x) \underline{\underline{3}} = 3\sin x - \underline{\underline{3\sin^3 x}}$$

$$\int (3\sin x - \sin^3 x) dx$$

$$3(-\cos x) - \frac{1}{3}(-\cos^3 x) + C \quad \text{check}$$

$$(3)(-)(-\sin x) + \cancel{\frac{1}{3}}(-\sin^3 x) \cdot \cancel{3}$$

$$3\sin x - \sin(3x)$$

$$\int \frac{\pi}{2} \cos \frac{\pi}{2} x \, dx$$

$$\cancel{\frac{\pi}{2}} \left( \sin \frac{\pi}{2} x \right) \cdot \cancel{\frac{2}{\pi}} + C$$

$$\sin \frac{\pi}{2} x + C$$

$$\cos \frac{\pi}{2} x \cdot \frac{\pi}{2} = \frac{\pi}{2} \cos \frac{\pi}{2} x$$

check

$$\int 2 \boxed{\sec t \tan t} dt$$

$$2 \sec t + C$$

$$\int 2 \sec 2t \tan 2t \, dt$$

$$\cancel{2} \sec 2t \cdot \cancel{\frac{1}{2}} + C$$

$$\sec 2t + C$$

$$\sec 2t \tan 2t \cdot 2$$

Der.

$$\int \left( \frac{2}{x-1} + \frac{1}{x} \right) dx$$

$$\int 2(x-1)^{-1} + x^{-1} dx$$

$$2 \ln(x-1) + \ln x + C$$

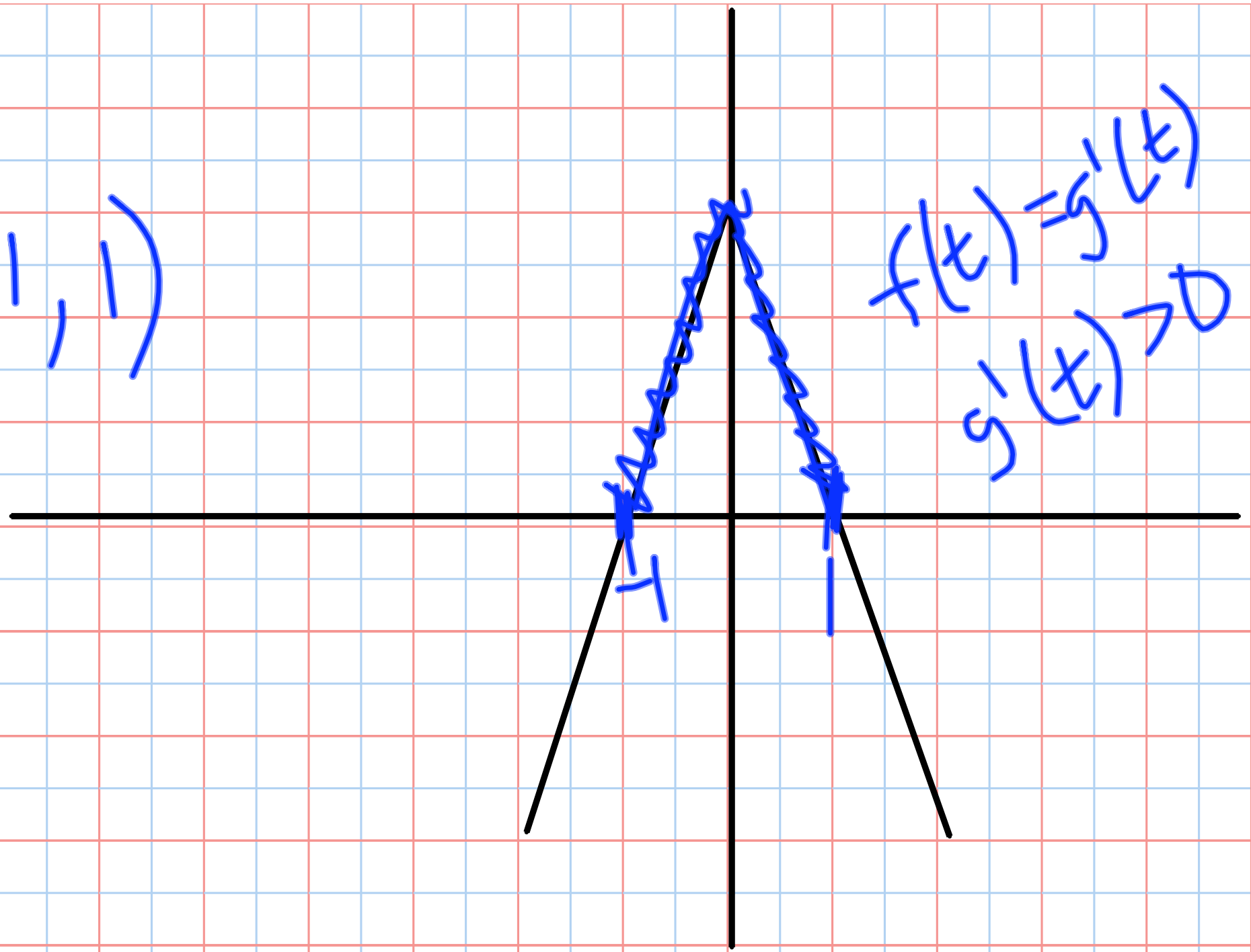
$$2 \cdot \frac{1}{x-1} + \frac{1}{x} = \frac{2}{x-1} + \frac{1}{x} \text{ der.}$$



B.

$(-1, 1)$

c



Concavity (2<sup>nd</sup>)  
Pts of Infl.

c

(0, 2)

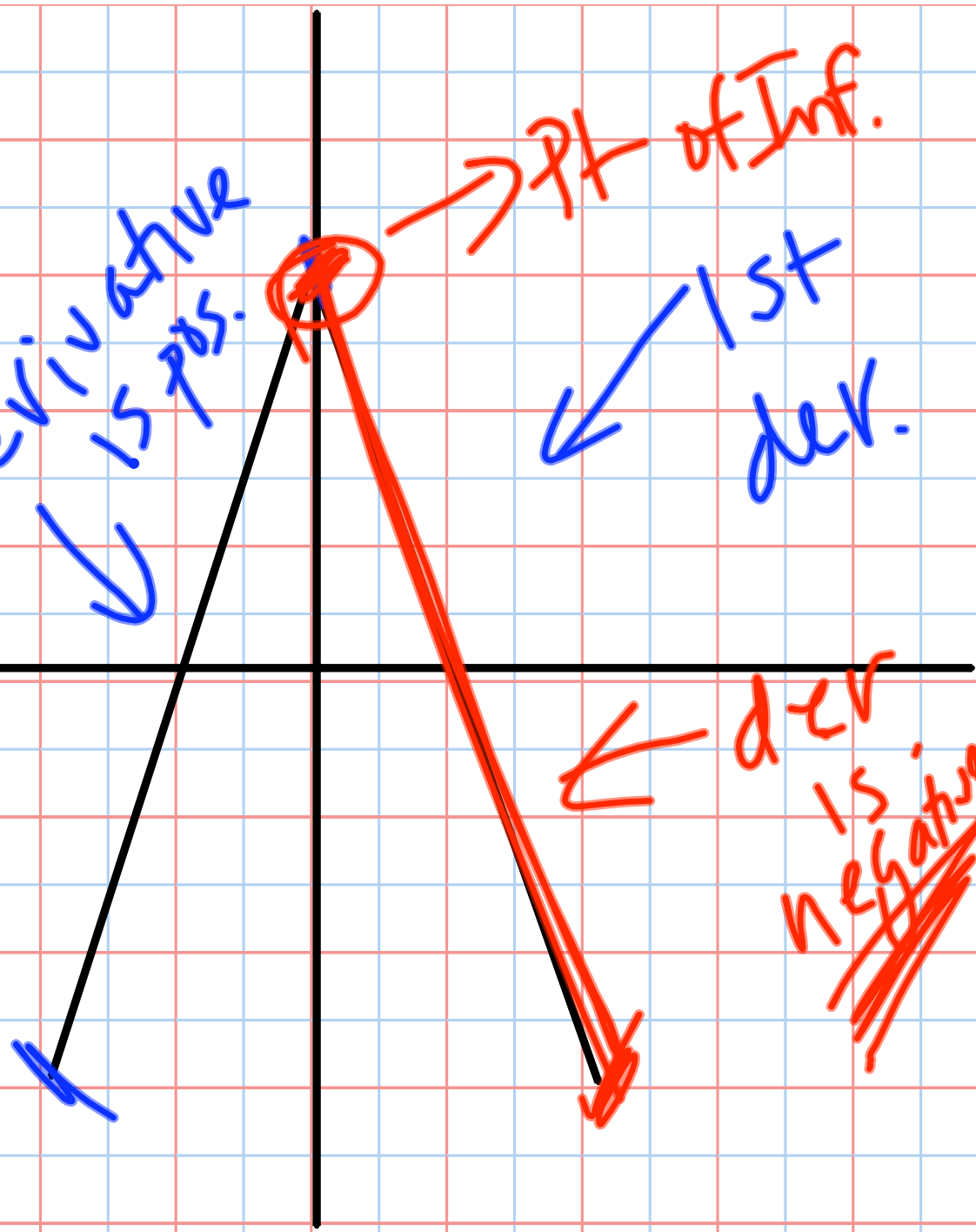
concave  
down

derivative  
is pos.

1<sup>st</sup>  
der.

der  
is  
negative

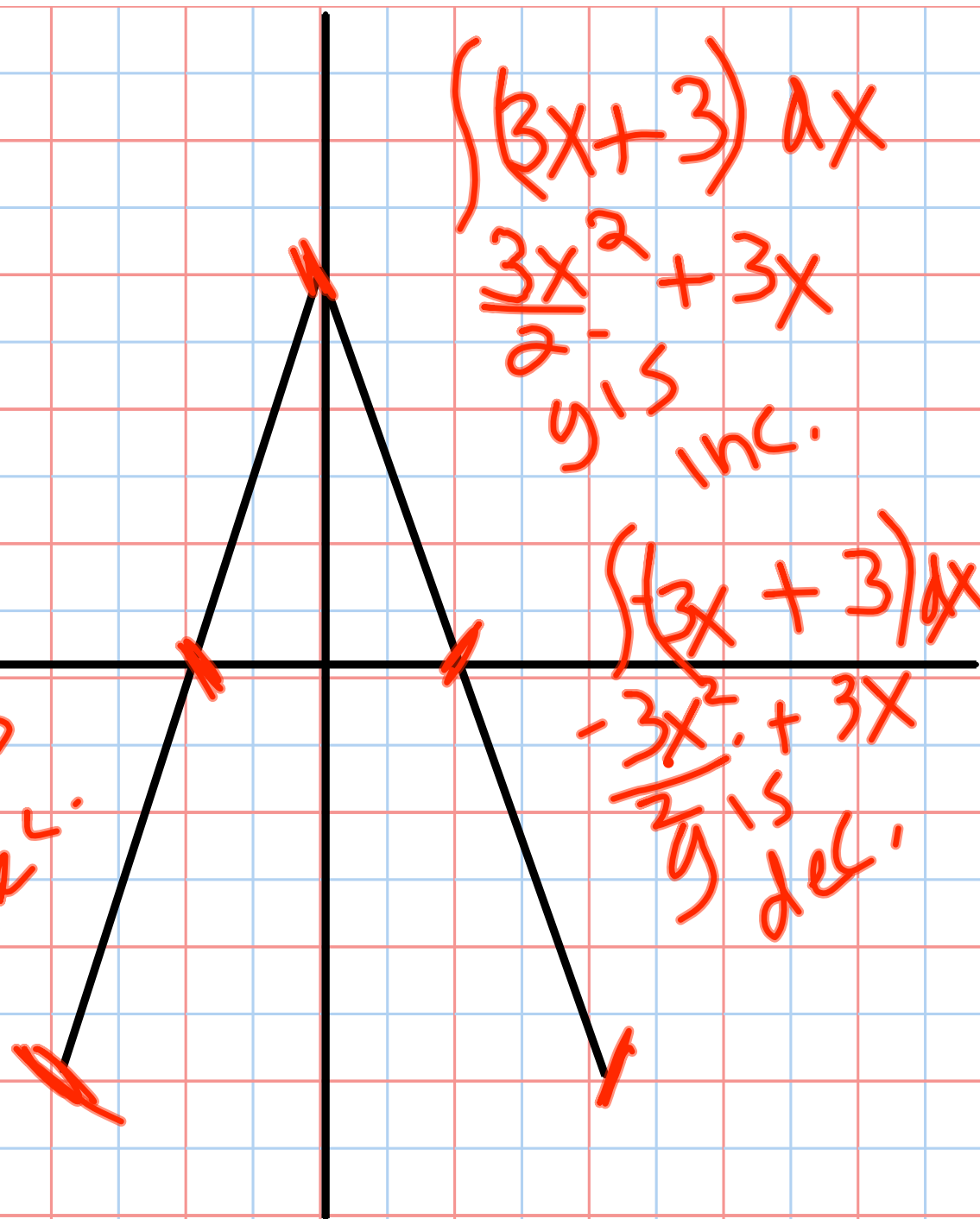
Pt of Inf.



c



$g'$  is dec.



$$\int (3x+3) dx$$
$$\frac{3x^2}{2} + 3x$$

$g'$  is inc.

$$\int -(3x+3) dx$$
$$-\frac{3x^2}{2} - 3x$$

$g'$  is dec.

$$g(x) = \int_0^x \underline{f(t)} dt$$

$$g(-1) = \int_0^{-1} f(t) dt = \frac{1}{2} \cdot 3 = \frac{3}{2}$$

$$g'(-1) = 0$$

$g'(-1) = 3$  (slope of the derivative at  $x = -1$ )

$$\underline{f(t) = g'(t)}$$

